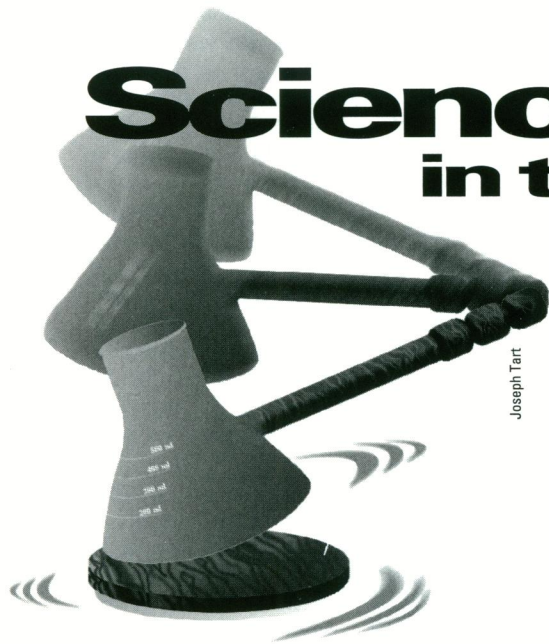


Science in the Court



Joseph Tart

Although we are still five years away from the 21st century, the science and technology that will affect the way we live our lives is already here and exerting its effects, particularly in the arena of the courtroom, where the search for cold hard facts runs up against the soft, mushy reality of the ambiguities of science, and scientists, lawyers, and judges often take different routes to find the "truth." In the last two years, in particular, members of both the legal and scientific professions have begun to work together to fashion, if not solutions, at least approaches to dealing with the issue of the use of scientific evidence in court.

Beginning in the 1960s, toxic tort litigation involving substances such as DDT, Agent Orange, asbestos, the Dalkon Shield, and Bendectin has pointed out the difficulties of cases in which scientific evidence is used, at least in part, to decide social, economic, and public policy issues. Concern for the ability of the courts to handle such cases has continued to grow. In 1993, the Carnegie Commission on Science, Technology, and Government published a report entitled *Science and Technology in Judicial Decision Making*. The report characterized the current criticism of the judicial handling of science and technology issues: "Critics have objected that judges cannot make appropriate decisions because they lack technical training, that jurors do not comprehend the complexity of the evidence they

are supposed to analyze, and that the expert witnesses on whom the system relies are mercenaries whose biased testimony frequently produces erroneous and inconsistent determinations." In answer to some of these criticisms, the commission's task force found that, in fact, judges are fairly adept at preventing so-called "junk science" from flooding their courtrooms and confounding juries, and that much of the criticism is fostered through misperceptions about the different methods and goals of science and law and the roles of the members of each profession. The task force, however, made several recommendations to improve the quality of adjudications involving science and technology including a more active role by judges in the management and presentation of science and technology evidence, judicial education programs and tools to acquaint judges with the fundamentals of scientific methodology, and greater institutional linkages between the judicial and scientific communities. A number of organizations from both science and legal professions have taken these recommendations to heart and are collaborating on efforts to improve the system.

One such effort is the development of a reference manual for judges on scientific topics to help guide them in managing cases centered around science and technology issues. The 600-page manual was prepared by the Federal Judicial Center, a research arm of the federal judiciary system, and will be sent to all federal judges this year. The primer consists of a series of overview papers by scientific and legal experts in areas such as toxicology and epidemiology, that have proved difficult for courts to manage. For instance, the epidemiology paper includes a discussion of case-control and cohort research study designs and how study design affects interpretation of data. Likewise, the toxicology section discusses *in vitro* and *in vivo* studies and extrapolation of data from animal studies to humans. Other

areas covered include DNA testing, survey research, statistics, and multiple regression analyses. Although patent and computer issues, which are now often inextricably intertwined in science and technology issues, were omitted, there are plans to add chapters to the manual to address these topics.

According to Joseph A. Cecil, project director for the manual, one of its major aims is not only to educate judges about scientific methods and terminology, but to help them assess scientific evidence as early in a case as possible. This is a goal that judicial reformers have called for so that costly and time-consuming legal cases may be made more efficient by the determination of the admissibility of evidence up front. The Supreme Court supported this goal in its 1993 decision in *Daubert et al. v. Merrell Dow Pharmaceuticals*, a product liability case involving the drug Bendectin, in which the Court advised judges to take a "gatekeeping" role in screening scientific evidence, using relevance and reliability rather than a peer-review standard as their guides. Placing the locus of decision-making on judges has made many judges more aware of the need for science education.

Another effort to meet this need has resulted in a package of tools designed to provide a foundation in the science of causation for judges assigned mass toxic tort litigation cases. The package, which contains a video and three resource documents, is titled "Science in the Court: Finding Your Way Through Mass Toxic Torts," and was produced through joint efforts of the State Justice Institute, the Human Genome Project at the U.S. Department of Energy, and the Einstein Institute for Science, Health, and the Courts, a nonprofit think tank in Bethesda, Maryland. The information in the package was presented to a group of nearly 300 judges in November 1994 at the National Conference on Mass Tort Management and will be available from

the Einstein Institute.

The video features judicial and scientific experts in various disciplines that underlie causation arguments in toxic tort cases. The three resource documents include a graphical overview of mass tort science, a guide book on causation studies, and a resource book on the types of scientific evidence that come into play in mass toxic tort cases.

The information presented at the conference on mass torts was compiled from a variety of sources, including the results of two focus groups and a questionnaire sent to judges invited to the conference. As part of a project entitled "Tools to Describe the Science Underpinnings of Mass Toxic Tort Litigation," two scientific focus groups were commissioned to forecast for judges characteristics of toxic tort cases and to suggest tools that might help judges plan case management and resolve evidence issues.

In September 1994, the Risk Science Institute of the International Life Sciences Institute convened a working group of 20 scientists and lawyers involved in conducting risk analyses for private companies or government agencies. The group forecasted a potential increase in mass tort litigation due to several factors, among them the rapid development of new technologies, the improved ability to detect diminishingly small quantities of potentially harmful substances in humans, limitations of safety and hazard testing, and emerging concern for adverse environmental effects. Also in September, a group of 20 academic scientists, including biologists, epidemiologists, water toxicologists, and environmental scientists from nine institutions was convened at the Medical College of Wisconsin. The Wisconsin group developed a list of categories as a plausible, high-priority litigation focus for the next decade. The list includes issues concerning toxic wastes such as radioactive, chemical, and medical waste; water issues such as quality, management, and contamination; air issues such as low-dose hazards and fine particles; operational releases such as chemical and weapons storage and transportation accidents; and exposure issues such as dental mercury and electromagnetic fields.

A survey questionnaire given to judges to assess their views about potential mass toxic tort issues also produced a ranking of "causes" of mass toxic tort lawsuits likely to challenge courts in the next 10 years, ranging from toxic chemicals in general to pesticides to electromagnetic fields, to waste sites. Judges also suggested procedural changes that might facilitate management of these types of cases, including alternative dispute resolution, specialized

courts, and judicial training.

Resource materials and characterizations of potential toxic torts are only tools, however, and it is up to the judges and parties involved to make use of them. Franklin Zweig, president of the Einstein Institute, said, "I think judges will use these materials when they feel comfortable and see the rationale for using them." One such rationale may be that the tools are one way of overcoming judges' mistrust of scientific evidence. Zweig says that in a question-and-answer session following the science resources plenary ses-

Judges' Future Forecast: Sources of Mass Tort Litigation

- Toxic chemicals
- New medicines and drugs
- Asbestos
- Tobacco
- Contaminated water
- Metal exposure
- Pesticides
- Radiation/Nuclear waste
- Electromagnetic fields
- Food preservatives and additives
- Specialized medical issues
- Waste sites
- Oil and other spills
- Silicon gel breast implants
- Dioxins
- Construction-related mass torts
- Fertilizers
- Transportation-related mass torts
- Other medical implants

Source: Einstein Institute for Science, Health, and the Courts

sion of the November conference, a large number of questions focused on the issue of fraud in science. "There appears to be a perception [on the part of judges] that fraud is widespread in science . . . and that reports, research results, and testimony may be contaminated [by] loyalty requirements of an 'old boy network,'" he said. At the session, Zweig says that scientists from organizations such as the American Association for the Advancement of Science attempted to counter this perception, stating that the scientific community believes fraud practices to be involved in a very small fraction of all scientific endeavors and that the mechanisms for dealing with it when it occurs are appropriate.

The AAAS is involved in another effort to diffuse this perception and forge a working relationship between the scientific and judicial communities to address scientific evidence problems. The National Conference of Lawyers and Scientists, a group sponsored by the AAAS, and the American Bar Association are developing mechanisms whereby scientists may assist in science and technology lawsuits by serving as court-appointed scientific experts or "special masters." Says Zweig, "Culling out the issues [in the pre-trial stage] might best be done, some judges believe, by masters trained in scientific issues." Still, many judges are reluctant to use such experts because of concerns about neutrality and judicial independence.

Judges concerned about judicial independence in their decisions on scientific evidence may have other factions to worry about than special masters. Part of a bill introduced by the Republican majority as part of its Contract with America program attempts to legislate a change in how judges determine the admissibility of scientific evidence. HR10, the Common Sense Litigation Act, contains a section that would seek to amend the Federal Rules of Evidence to include a presumption of scientific invalidity that has to be overcome by a judge before scientific evidence would be admissible.

Hearings are expected to be held on the Common Sense Litigation Act in early 1995. Undoubtedly these hearings will not resolve the questions of who will determine the validity of scientific evidence and how. An increased awareness of these issues and further cooperation between the scientific and judicial communities, however, may eventually fashion solutions which both professions may use in approaching the 21st century and their respective searches for truth.

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